

## DRAWINGS ATTACHED

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## (54) A BOLT FOR A DOOR LOCK

(71) We, ADAMS RITE MANUFACTURING COMPANY, a Corporation organized and existing under the laws of the State of California, United States of America, of 540 Chevy Chase Drive, Glendale, State of California, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a bolt for a door lock.

For a great many years, lock manufacturers have been attempting to provide a maximum of security in locks for general use in, for example, stores, home. A great deal of the research in this area has been in connection with attempts to build a lock bolt which would successfully resist the known methods and procedures as utilized by persons intent upon making an unlawful entry.

In this connection various types of constructions have been used in an effort to develop a bolt which could be economically produced and yet afford an exceedingly high degree of security. Laminated bolts using case hardened metals, tough hard steel materials, and similar type materials have been used, but these materials could be cut with saws of tungsten carbide materials or certain tough steels.

The present invention proposes to overcome this problem by utilizing an insert of a ceramic material commercially known as AD 94 Ceramic, which is available from Coors Porcelain Co. of Golden, Colorado, or an equivalent material. These materials have an extremely high degree of hardness and are substantially impossible to machine or cut with a tungsten carbide or steel saw. By supporting this insert within

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the lock bolt, as the insert might otherwise become fractured, it would still be able to effectively perform its function.

The present invention relates generally to locks, and is more particularly concerned with the structure embodied in the lock bolt in order to obtain a maximum of security.

According to one aspect of this invention there is provided a bolt for a door lock, said bolt, when mounted on the door, bridging the gap between the door and associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: at least one main body part of a machinable metallic material; and an element rigidly secured against relative movement on said part and having a dimension, in the locked position of the bolt when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of a non-metallic material having a hardness substantially greater than that of the material of the main body part and being substantially impervious to metal machining operations.

According to another aspect of this invention there is provided a bolt for a door lock, said bolt, when mounted on the door, bridging the gap between the door and associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: at least one main body part of a machinable metallic material; and an element of ceramic material carried by said part having a dimension, in the locked position of the bolt, when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of material having a hardness substantially greater than that of the material of the main body part and being substantially impervious to metal machining operations.

According to a still further aspect of this invention there is provided a bolt for a door lock said bolt, when mounted on the door, bridging the gap between the door and associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: a laminated main body part formed of a plurality of plate members of a machinable metallic material and a flat plate element positioned in parallel relation between the outermost plate members of said body part having a dimension, in the locked position of the bolt, when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of non-metallic material having a hardness substantially greater than that of the material of the main body plates and being substantially impervious to metal machining operations.

Having in mind the inherent disadvantages of the prior attempts to successfully solve this problem, it is a feature of the present invention to provide an improved lock bolt which can be produced economically, and yet which will provide a greater degree of protection than possible in heretofore known structures.

Another feature is to provide a lock bolt of composite construction, which utilizes as one of the materials in its construction, a ceramic material having extreme hardness and which is substantially impervious to the known metal machining or cutting operations, for example, such as sawing, chiselling, drilling etc.

Another feature is to provide a bolt construction having a ceramic insert seated therein in a captive manner so that in the event that the insert should become fractured, it will still operate efficiently as a deterrent to attempts to cut through the bolt structure.

A still further feature is to provide a ceramic insert of such configuration that it may be readily adapted without change for use in both short and long bolt structures.

Further features and advantages will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing several embodiments of the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

Figure 1 is a perspective view of a locking mechanism having a bolt embodying the present invention, together with an associated door jamb having a bolt receiving opening therein;

Figure 2 is a detailed elevational view of a bolt as shown in Fig. 1, portions being cut away to disclose the insert completely supported therein;

Fig. 3 is a transverse section through the bolt taken substantially on line 3-3;

Fig. 4 is a longitudinal section taken substantially on line 4-4 of Fig. 2;

Fig. 5 is a fragmentary view disclosing a modified ceramic insert configuration for use in long bolts;

Fig. 6 is a similar view utilizing the same insert but shifted in its orientation to adapt it for use in short bolt structures; and

Fig. 7 is a fragmentary view illustrating the insert as used in a hook-type bolt.

Referring more specifically to the drawings, for illustrative purposes, the bolt is shown as being embodied in a lock structure which is secured in one face of a door frame 10, the lock structure being provided with a known face plate 11 retained by screws 12 and having an opening 13 through which a locking bolt 14 is actuatable by a known type of key actuated lock cylinder means 15 into extended locking position and retracted unlocked position. In the locked position, the bolt 14 will extend into a bolt receiving opening 16 of an associated door jamb 17.

It will be appreciated that in the locked door position, a gap will necessarily exist between the edge of the locked door and the associated door jamb, which provides a space wherein a cutting tool such as a saw may be inserted for the purpose of attempting to saw through the bolt and thus gain unlawful entry. The present invention prevents such an operation by providing a lock structure which contains a material which spans the gap between the locked door and the associated jamb, and which material is substantially impervious to known cutting methods.

The lock bolt 14 is internally provided with a cavity 18, which in this case may be made in one of the bolt laminations, having in this case a square or rectangular configuration, and within which there is seated in a captive manner a ceramic insert 19. This insert is of such width that it will span the gap between the locked door and the adjacent door jamb. The material of the insert is as previously identified, or its equivalent. It will be appreciated that by securing the insert in this manner, should it become fractured, it will still effectively perform its function. While it might be possible to penetrate the outer material of the bolt by a sawing operation, the continued penetration will be circumvented effectively by the ceramic insert.

Referring to Figures 5 and 6, it will be seen that the insert 19' has been modified as to its configuration so that by orienting the insert as shown in Figure 5 it can be utilized with a long bolt structure such as that shown in Figure 2, while by shifting it to a position as shown in Figure 6 it can

be utilized with the known type of short bolt structure. This dual application is possible by cutting off one of the corners of the rectangular configuration, as indicated at 20, so as to accommodate to the different arrangement of pins for securing the bolt laminations on the long and short bolt structures.

Referring now to Figure 7, an insert 19' of smaller dimensions than that utilized in the structures of Figs. 5 and 6 is shown as being used with a hook-type bolt structure 14'. In this arrangement, it will be observed that the insert is positioned in the material at the bottom of the hook portion of the bolt.

#### WHAT WE CLAIM IS:—

1. A bolt for a door lock, said bolt, when mounted on the door, bridging the gap between the door and an associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: at least one main body part of a machinable metallic material; and an element rigidly secured against relative movement on said part and having a dimension, in the locked position of the bolt, when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of a non-metallic material having a hardness substantially greater than that of the material of the main body part and being substantially impervious to metal machining operations.
2. A bolt for a door lock, said bolt, when mounted on the door, bridging the gap between the door and an associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: at least one main body part of a machinable metallic material; and an element of ceramic material carried by said part having a dimension, in the locked position of the bolt, when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of material having a hardness substantially greater than that of

the material of the main body part and being substantially impervious to metal machining operations.

3. A bolt according to claim 1 or 2, wherein the element is seated in a captive manner within the main body part.

4. A bolt according to claim 3, wherein the main part is constructed with an internal cavity, and said element is confined within said cavity.

5. A bolt according to claim 4, wherein the element conforms to the shape of the cavity and is seated snugly therein.

6. A bolt according to claim 5, wherein the element comprises a multi-sided insert.

7. A bolt according to claim 6, wherein the insert is of rectangular configuration.

8. A bolt for a door lock said bolt, when mounted on the door, bridging the gap between the door and an associated door jamb when the door is in a locked position, comprising: (a) a composite bolt structure including: a laminated main body part formed of a plurality of plate members of a machinable metallic material and a flat plate element positioned in parallel relation between the outermost plate members of said body part having a dimension, in the locked position of the bolt, when mounted on the door, to bridge the gap between the locked door and door jamb, said element being of non-metallic material having a hardness substantially greater than that of the material of the main body plates and being substantially impervious to metal machining operations.

9. A bolt according to claim 8, wherein the main part has hook-shaped plate members and the element is positioned at the bottom portion of the hook.

10. A bolt for a door lock, substantially as hereinbefore described, having reference to the accompanying drawings.

MARKS & CLERK,  
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Agents for the Applicants.

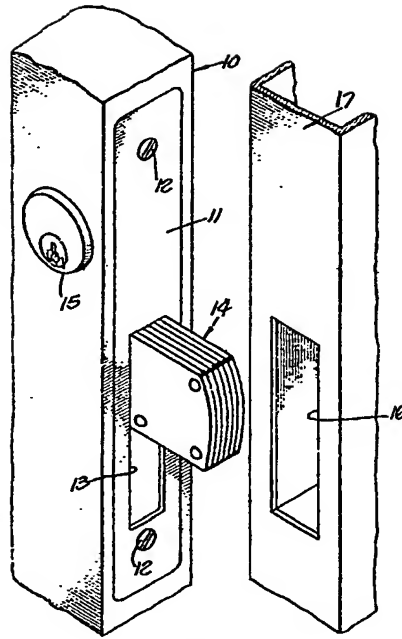


FIG. 1.

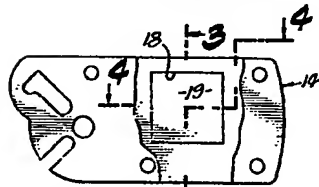


FIG. 2.

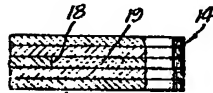


FIG. 3.

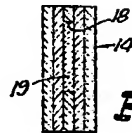


FIG. 4.

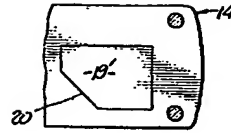


FIG. 5.

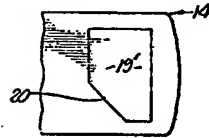


FIG. 6.

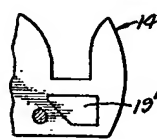


FIG. 7.